Remarks:

Claims 1-21 are in this case. All claims have been rejected.

REJECTION UNDER 35 U.S.C. §102:

Claims 14-21 are rejected under 35 U.S.C. §102 (b) as anticipated by U.S. Patent No. 5,299,212, "*Article comprising a wavelength-stabilized semiconductor laser*", issued March 29, 1994 to Koch, et al. (hereinafter "Koch"). These rejections are respectfully traversed.

It is well established that a claimed invention is anticipated by a prior art patent only if the patent discloses each and every limitation of the claim. In the present case, independent claim 14, calls for an optical pulse source to generate RZ pulses at a wavelength λ comprising a fused fiber PM coupler coupled to the light source.

Koch is wholly devoid of any disclosure or reference to a polarization maintaining (PM) coupler, nor does Koch recognize polarization as an issue. In fact, the terms polarization or PM do not appear at all in the Koch patent. Koch does not disclose a fused fiber PM coupler and therefore cannot anticipate claim 14. Claims 15 to 21 as dependent on independent claim 14, include all of the limitations from which they depend. Koch does not anticipate claim 14, thus it also does not anticipate those claims that depend from claim 14.

REJECTION UNDER 35 U.S.C. §103:

Claims 2-6 and 10-13 are rejected under 35 U.S.C. §103 as obvious in view of U.S. Patent No. 5,299,212, "*Article comprising a wavelength-stabilized semiconductor laser*", issued March 29, 1994 to Koch, et al. (hereinafter "Koch") and in further view of U.S. Patent No. 6,611,645, "*Signal analyzer using tapped optical fibers*", issued August 26, 2003 to Aleksoff, et al. (hereinafter "Aleksoff"). These rejections are believed inapplicable to the claims as amended.

It is well established in order for a combination of references to make a claimed invention obvious, the references must teach or suggest every limitation of the claim. "Rarely, however, will the skill in the art ... operate to supply missing knowledge or prior art to reach an obviousness judgment". (Al-Site Corp. v. VSI International, Inc., 174 F.3d 1308 (Fed. Cir. 1999)). Where the prior art references do not teach the limitations, one can not label them as obvious through hindsight. (W.L. Gore & Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed.Cir. I983)).

The invention calls for an optical pulse source for generating RZ pulses at a wavelength λ. Tapped signals representative of the light supplied to the grating and the light reflected or transmitted by the grating, in combination with a feedback circuit responsive to the tapped signals, are used to adjust the wavelength λ of the light source. The tapped structure can be made very compact by use of tilted fiber tap or a fused fiber polarization maintaining (PM) coupler. The references are wholly devoid of tapped signals derived from a fused fiber PM coupler.

RZ (return to zero) pulse sources are used in WDM and DWDM optical communication systems. RZ pulse sources have been built previously using variety of laser modulator configurations. But, these implementations have required high mechanical stability (e.g. mode locked lasers, Specification, page 2, lines 7-8) and power inefficient and of large size (e.g. a CW laser / $LiNbO_3$ modulator combination, Specification, page 2, lines 19-25).

The inventor's have developed a robust, compact, and power efficient RZ optical pulse source that can be fabricated into compact optical packages. The invention employs a direct modulated laser modulated in power and frequency, and locked to the edge of the wavelength response curve of a fiber grating. The optical pulse generator uses a compact and robust tilted grating tap or a fused fiber PM coupler to develop the feedback signals. The use of these taps enabled the inventors to package the grating / tap structure and photodetectors into a single compact optical package. (Specification, figs. 1, 2, element 102). Wavelength stabilization systems using gratings according to the prior art have employed various types of bulk optical components. Such construction precluded the compact form made possible by the instant invention.

Koch discloses a wavelength stabilized laser that solved a previous problem where there is more than one transmission minimum precluding laser wavelength lock at one unique wavelength on cold startup. Koch does not disclose an optical pulse generator where the light source is modulated in power and frequency. Further, Koch's solution relies on bulk optical components. (Koch, fig. 3). Koch's feedback loop is rudimentary and is not capable of shaping ultra fast pulses as is done by the inventive optical pulse generator (Specification, page 6, lines 4-16).

Aleksoff is proffered as supplying the limitation of a tilted fiber tap of the compact optical package of the instant invention, but the context of Aleksoff's invention is quite different. Aleksoff discloses a two-dimension fiber delay radiator (FDR) to generate a large time-bandwidth-product spectrum. The device is made with taps that are Bragg gratings orientated at 45 degrees to a fiber core. The optical fiber is wound on a cylindrical-like form such that a number of loops of the fiber are available for making a number of taps on each loop. Taps are preferably generated along each loop of the fiber so that a small portion of the light propagating in the fiber will exit sideways from fiber at the taps. A video camera then captures this Fourier Transform light and the power spectrum of the light signal is displayed on a monitor. (Aleksoff, col. 1, line 49 to col. 2 line 6). Moreover, Aleksoff teaches are relatively large two dimensional array of to achieve good resolution. (Aleksoff, col. 4, line 54 to col. 5, line 14). His spectrum analyzer array can be 10 by 50 cm. (Aleksoff, col. 4, line 18).

By contrast, the instant invention is a very compact optical pulse source to generate RZ pulses at a wavelength λ comprising a tilted grating tap coupled to the light source and the Bragg grating for tapping a signal representative of the light supplied to the grating and a signal representative of the light reflected or transmitted by the grating; and, a feedback circuit responsive to the tapped signals for adjusting the wavelength λ of the light source. The inventive structure is small and lends itself to a compact optical package.

The inventive use of the tilted grating tap is to control the wavelength of a laser. In further contrast, Aleksoff teaches the use of a large array of taps with a matching array of detectors and complex signal processing techniques to generate a large time-bandwidth-product spectrum. Aleksoff is silent on the problem and solution of laser wavelength control based on the measurement of light supplied to a grating and a signal representative of the light reflected or transmitted by the grating. Aleksoff offers nothing more than the existence of tilted grating taps. There is no suggest, teaching, or motivation conveyed to one skilled in the art regarding the inventive application of this optical component. The combination has been constructed through Examiner hindsight.

Koch does not anticipate the use of a polarization maintaining fiber coupler and neither Koch nor Aleksoff taken alone or in combination, teach, suggest, or motivate one skilled in the art to build the generator of the instant invention. All rejections are thus respectfully traversed. It is believe that the application fully complies with all provisions of 35 U.S.C. §102 and 35 U.S.C. §103. The application should be allowed.

Respectfully submitted,

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